Assessing the Vulnerability of Species and Ecosystems to Projected Future Climate Change in the Pacific Northwest

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Summary: To develop effective adaptive management plans, conservation and natural resource managers need to know how climate change will affect the species and ecosystems they manage. This project will provide managers with information about potential climate change effects on species and managed areas in the Pacific Northwest. We will evaluate projected changes in climate, vegetation, and species distributions through the year 2099 and assess the potential impacts of these changes on key species and managed lands. We will work with conservation and natural resource managers to incorporate the results of this study into state, federal, and non-governmental organization (NGO) management plans. The projected changes in climate, vegetation, and species distributions will be summarized for the entire study region as well as for specific land management units, including National Parks, state and federal fish and wildlife refuges, and The Nature Conservancy (TNC) owned and managed sites.

The project has six specific objectives:

(1) Downscaling future climate simulations from 6 coupled atmosphere-ocean general circulation models (AOGCMs) to high spatial resolution grids (e.g., 1-km) of the Pacific Northwest. Monthly data are being developed extending through the year 2099. Bioclimatic variables (e.g., growing degree days) will be calculated from the downscaled climate data.

(2) Simulating potential future vegetation changes using dynamic vegetation models. These simulations will provide an estimate of potential future habitat change.

(3) Modeling potential shifts in the distributions of 12 or more focal animal species. These species will be chosen in discussions with land managers from the region.

The Pacific Northwest study area and the The Nature Conservancy ecoregions (TNC 2006) intersecting Idaho, Oregon, and Washington. (Map: R. Pelltier, USGS)

(4) Assessing the vulnerabilities of species and managed lands to future climate change. This assessment will be based on the projected changes in climate, vegetation, and species distributions as well as on inherent species and ecosystem sensitivities to climate change.

(5) Summarizing the uncertainties in the simulated climate, vegetation, and species distribution changes.

(6) Working in collaboration with managers to incorporate the research results into conservation and natural resource management plans.